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**Neuroscience-Spring 2012**

**Practice Final Exam**

***Note: I wrote up these questions using our lectures from last year. While they are very similar—and often identical—to the ones used this year, some may vary slightly, so a couple of the questions on here might not have been covered in your lectures. If you find any errors or have any questions, please let me know. Also, I take no responsibility for you getting anything wrong on the real exam---this is merely practice for your benefit. Finally, please note that this practice exam covers only the material after the midterm. However, the real final will also contain cumulative material, as well as self-study and patient presentation questions. Good luck!!***

1. Which statement is true about the autonomic nervous system?
2. Pelvic splanchnic nerves carry both mechanosensory and pain afferent axons.
3. As part of the “fight or flight” aspect of the stress response, CRH is released by the anterior pituitary, which in turn causes ACTH release by the adrenal cortex and subsequent epinephrine release from the adrenal medulla.
4. The sympathetic nervous system supplies the lacrimal gland, causing tear production.
5. The submandibular ganglion contains axons that emerge from preganglionic cell bodies in the Edinger-Westphal Nucleus.
6. Statements a-d are all false.
7. The Dorsal Motor Nucleus of the Vagus
8. Is located on the floor of the 3rd ventricle.
9. Is the source of vagal efferents that are responsible for, among other things, dilation of the bronchial tree.
10. Provides somatic motor fibers to the pharyngeal muscles.
11. Is the source of sympathetic efferent axons that project to terminal ganglia via the vagus nerve.
12. None of the above.
13. Which statement is true about the enteric nervous system?
14. Meissner’s plexus lies between the external longitudinal and circular smooth muscle layers.
15. The system receives parasympathetic innervation by way of postganglionic axons from prevertebral ganglia.
16. The system innervates only the pancreas and GI tract.
17. The system is not associated with the maintenance of homeostasis.
18. Hirschprung’s Disease is caused by the absence of ganglion cells in Auerbach’s plexus.
19. Rhythmic alternation circuits involve
20. Feed-forward excitatory signals
21. Feed-forward inhibitory signals
22. Feed-back excitatory signals
23. Feed-back inhibitory signals
24. Flower spray endings
25. Form spirals around nuclear bag and nuclear chain fibers
26. Give rise to type Ib afferent axons
27. Are sensitive to intrafusal fiber stretching
28. Detect velocity of stretching
29. Are only found in the Golgi Tendon Organ
30. The lengthening reflex is
31. Modulated by the muscle spindle
32. Modulated by a structure with type II axons
33. Mixed (i.e. both excitatory and inhibitory)
34. Modulated by a structure that provides proprioceptive input to the cerebellum
35. Excitatory

For questions 7-10, match each description to the appropriate medical imaging technique. Answers can, hypothetically, be used more than once (but they probably won’t be). They can also not be used at all (this is more likely). **Choose the most specific answer!**

1. Though this technique is good to visualize small density differences, it has numerous associated problems, including high cost and problems with image archiving.
2. Ultrasound
3. CT
4. X-ray
5. Nuclear Medicine
6. MRI
7. This technique commonly involves the use of galdolinium as a contrast agent.
8. Ultrasound
9. CT
10. X-ray
11. Nuclear Medicine
12. MRI
13. This technique, though safe, has limited use because of the difficulty involved with imaging past air or bone.
14. Ultrasound
15. CT
16. X-ray
17. Nuclear Medicine
18. MRI
19. A gamma camera is used to take images from different angles, and record data in a series of cross sectional slices.
20. Nuclear medicine
21. SPECT
22. PET
23. CT
24. fMRI
25. In a patient with chronic denervation, which of the following would you see on an EMG?
26. Fibrillations and complex repetitive discharges
27. Fasiculations and Fibrillations
28. Fasiculations and complex repetitive discharges
29. Fibrillations and positive sharp waves.
30. Positive sharp waves and complex repetitive discharges
31. Which statement is true about nerve conduction studies and late responses (F reflexes)?
32. Both are good for studying distal elements only
33. Both are good for studying both proximal and distal elements
34. NC studies are better at studying proximal elements
35. F reflexes are better at studying distal elements
36. None of the above
37. The medial reticulospinal tract
38. Originates in the medulla
39. Innervates both flexors and extensors
40. Stays ipsilateral
41. All of the above
42. None of the above
43. Which of these symptoms would you expect to see in a patient with Brown-Sequard Syndrome?
44. Contralateral loss of voluntary movement at the level of the lesion
45. Ipsilateral loss of voluntary movement at and below the level of the lesion
46. Contralateral loss of voluntary movement below the level of the lesion
47. Ipsilateral loss of pain and temperature sensations below the level of the lesion
48. Contralateral loss of pain and temperature sensations at the level of the lesion
49. The medial vestibulospinal tract
50. Stops at lower spinal cord levels than the lateral vestibulospinal tract
51. Excites extensor muscles
52. Originates from a nucleus that is involved in modulating linear acceleration
53. All of the above
54. None of the above
55. Which of the following is not a result of glial toxicity?
56. Microglia lose the ability to eat amyloid
57. Astrocytes lose the ability to scavenge excitatory neurotransmitters
58. Inflammatory factors are produced
59. Decrease in astrocyte NADPH oxidase
60. All of the above result from glial toxicity
61. Which statement about ALS is false?
62. It is a disease that involves both upper and lower motor neuron loss
63. It is more common in males than females
64. Lead exposure is an environmental correlate for ALS
65. The average age of onset is approximately 30 years
66. All of the above are true

For questions 18-20, please choose **ALL** correct answers. There may be more than one correct (but never less than one). Each question describes a condition/disorder/situation. Choose all statements that describe what would happen given the condition (i.e., all true statements). Please note that for inhibitory activity, “increased” means “more/stronger inhibition.”

1. There is an acute ischemic lesion to the subthalamic nucleus.
2. The inhibitory activity of the striatum at the GPi/SNr complex is increased.
3. The excitatory activity of the thalamus at the cortex is increased.
4. The inhibitory activity of the GPi/SNr complex at the thalamus is increased.
5. The inhibitory activity of the striatum at the GPe is reduced.
6. The excitatory activity of the cortex on the striatum is increased.
7. Parkinsonism.
8. All activity (excitatory and inhibitory) of the SNc at the striatum is reduced.
9. The excitatory activity of the subthalamic nucleus at the GPi/SNr complex is increased.
10. The inhibitory activity of the striatum on the GPe is reduced.
11. The inhibitory activity of the GPi/SNr complex on the thalamus is increased.
12. The inhibitory activity of the striatum on the GPi/SNr complex is reduced.
13. There is a deficiency of striatal neurons that express the D2 receptor, but the number of striatal neurons expressing the D1 receptor is fairly normal.
14. The inhibitory activity of the GPi/SNr complex on the thalamus is reduced.
15. The inhibitory activity of the GPe on the subthalamic nucleus is increased.
16. The excitatory input from the thalamus to the cortex is reduced.
17. The inhibitory activity of the striatum at the GPi/SNr complex is significantly reduced.
18. This patient would likely show symptoms consistent with a hypokinetic disorder.

For all further questions, there is only one correct answer.

1. In experiments done to test the function of the Supplementary Motor Cortex (SMA), it was determined that the PET signal was enhanced in the SMA
2. Only for imagined, but not performed, movements
3. For both planned and unplanned movements
4. For planned, unplanned, and imagined movements
5. For both unplanned and imagined movements
6. For both planned and imagined movements
7. The motor systems of Parkinson’s Disease are due to a failure of certain neurons to become active enough to generate the internal movement sequences that are required in walking, hand-flexing, etc. Where are these neurons located?
8. Supplementary motor cortex
9. Premotor cortex
10. Primary motor cortex
11. All of the above
12. None of the above
13. Which of the following is not a part of Papez’ original circuit?
14. Mammillary body
15. Anterior nucleus of the thalamus
16. Ventral basal ganglia
17. Cingulate gyrus
18. All of the above are part of the aforementioned circuit.
19. In the global recurrent circuit of the limbic system,
20. Mossy fibers project directly to the CA1 region pyramidal neurons
21. Schaffer collaterals are axons of CA1 region pyramidal neurons
22. The CA1region pyramidal neurons send their axons to the subiculum
23. Mossy fibers project directly to the entorhinal cortex
24. The perforant path describes the projection of axons from the subiculum to the entorhinal cortex
25. When considering extrinsic connections to and from the hippocampal formation and septal nuclei, which statement is true?
26. The precommissural fornix carries axons from the subiculum
27. The postcommissural fornix carries axons to the anterior thalamus
28. The precommissural fornix carries axons to the mammillary bodies
29. The postcommissural fornix carries axons to the septal nuclei
30. The precommissural fornix carries axons to the subiculum
31. Purkinje cells of the cerebellum
32. Use glutamate as a neurotransmitter
33. Receive inputs only from parallel fibers
34. Have their dendrites in the purkinje cell layer
35. Receive inputs from mossy fibers
36. None of the above
37. The inferior vermis of the cerebellum is supplied by what artery?
38. AICA
39. PICA
40. SCA
41. Anterior cerebral
42. Middle cerebral
43. Which statement is true concerning cerebellar connections involving the superior cerebellar peduncle?
44. The cerebellum-cerebellum loop involves a decussation at the dentate nucleus.
45. The cerebrum-cerebellum loop involves a decussation at the dentate nucleus.
46. The SCP carries efferent fibers only.
47. The SCP carries afferent impulses from the Golgi Tendon Organ.
48. The SCP carries afferent impulses from the contralateral pontine nucleus.
49. The supraoptic nucleus of the hypothalamus exerts control over (note: there are 2 correct answers here)
50. The anterior pituitary
51. The posterior pituitary
52. ACTH
53. ADH
54. The basal ganglia
55. The most common benign primary brain tumor is a(n)
56. Astrocytoma
57. Meningioma
58. Glioblastoma
59. Medulloblastoma
60. Schwannoma
61. Which of the following is not a histological characteristic of GBM (Glioblastoma Multiforme)?
62. Palissading
63. Pseudo palissading
64. Nuclear pleomorphism
65. Necrosis
66. Endothelial proliferation
67. NF1 genes (tumor suppressors) are often mutated in
68. Glioblastomas
69. Meningiomas
70. Schwannomas
71. Medulloblastomas
72. Rhabdoid tumors
73. Which of the following structures is not involved in the formation of declarative memory?
74. Mammillary bodies
75. Dentate gyrus
76. Dorsal frontal cortex
77. Cerebellum
78. None of the above (i.e. a-d are all involved)
79. As it relates to long-term potentiation and subsequent memory formation, nitric oxide synthase (NOS)
80. Has the same effect as PKC
81. Exerts its effects postsynaptically
82. Is activated by sodium influx following activation of NMDA receptors
83. Phosphorylates receptor proteins
84. Increases the initial effect resulting from stimulation of Schaffer collaterals
85. In the process of memory consolidation for the formation of long-term memory, which statement is true?
86. PKA phosphorylates CREB2, which relieves CREB2 suppression of CREB1
87. Ubiquitin hydrolase diminishes PKA activity
88. CREB1 and CREB2 have identical functions
89. PKC phosphorylates CREB1
90. None of the above
91. For visual perception, the dorsal subsystem
92. Begins in the lingual gyrus
93. Begins below the calcarine sulcus
94. Is involved in shape and color recognition
95. Begins in Brodmann’s areas 30 and 31
96. Is involved in identifying where a visual target is
97. Olfactory perception occurs in cortical areas of which lobe(s)
98. Frontal and parietal
99. Frontal and temporal
100. Parietal and temporal
101. Frontal and occipital
102. Parietal and occipital
103. Studies of consciousness on patients with lesions of the primary visual cortex show that there can be
104. Recognition and awareness
105. Awareness without recognition
106. Recognition without awareness
107. Different degrees of consciousness in different hemispheres
108. Awareness of being aware of something
109. Gerstmann Syndrome is symptomatic if a disorder/disease of what lobe?
110. Frontal
111. Parietal
112. Occipital
113. Temporal
114. Right lobe of the liver
115. Loss of verbal associative fluency is indicative of a disease of the
116. Left frontal lobe
117. Right frontal lobe
118. Dominant parietal lobe
119. Nondominant parietal lobe
120. Occipital lobe
121. Anton’s syndrome is a disease of which lobe?
122. Frontal
123. Parietal
124. Occipital
125. Temporal
126. A frequency of 7 Hz is indicative of what type of wave on an EEG?
127. Alpha
128. Beta
129. Theta
130. Delta
131. Mu
132. K complexes classify what stage of sleep?
133. I
134. II
135. III
136. IV
137. REM
138. Which of the following stroke types is most common?
139. Primary hemorrhagic-subarachnoid hemorrhage
140. Primary hemorrhagic-intracerebral hemorrhage
141. Primary ischemic-anterior circulation
142. Primary ischemic-posterior circulation
143. All are equally common
144. Aphasia often results from a stroke involving areas supplied by what artery
145. Middle cerebral
146. Anterior cerebral
147. Posterior cerebral
148. AICA
149. PICA
150. Which symptoms of Alzheimer’s Disease usually appears latest?
151. Blunting of emotions
152. Apathy
153. Repetitiveness of a word
154. Failure to recognize others
155. Emotional disinhibition
156. A comparison of normal (N) and scrapie (S) PrP isoforms shows that
157. N is protease resistant
158. S is located on the vesicles of cells
159. N is released by phospholipase C
160. S has a shorter degradation time
161. N co-isolates with amyloid rode
162. Which statement is true about plaques and tangles with respect to Alzheimer’s disease?
163. Plaques contain tau protein
164. Tangles do not kill neurons
165. Plaques are used to identify the stage of Alzheimer’s disease
166. Tangles are used to identify the stage of Alzheimer’s disease
167. None of the above
168. The pituitary gland develops from
169. Endoderm
170. Mesoderm
171. Ectoderm
172. A and C
173. B and C
174. The pontine nuclei develop from the
175. Prosencephalon
176. Mesencephalon
177. Rhombencephalon
178. B and C
179. A and B